JOURNAL OF GREAT LAKES RESEARCH INDEX: VOLUME 16, 1990

VOL. 16	1990	No. 1

Editorial

Great Lakes research. **Robert A. Ragotzkie** 1

Articles

Sediment core chronology and sedimentation in coastal basins of Georgian Bay. **M. G. Johnson, S. E. George, and L. R. Culp** 3

Effects of winter temperature and predation on the abundance of alewife (*Alosa pseudoharengus*) in the Bay of Quinte, Lake Ontario. **Mark S. Ridgway, D. A. Hurley, and K. A. Scott** 11

Organochlorine contaminants in duck populations of Walpole Island. **Craig E. Hebert, G. Douglas Haffner, I. Michael Weis, Rodica Lazar, and Laurie Montour** 21

Comparative ecology of *Pontoporeia hoyi* populations in southern Lake Michigan: the profundal region versus the slope and shelf regions. **Marlene S. Evans, Michael A. Quigley, and James A. Wojcik** 27

Blue-sac disease in Lake Ontario lake trout. **John Symula, Jim Meade, Jack C. Skea, Loretta Cummings, James R. Colquhoun, Howard J. Dean, and John Miccoli** 41

Measures of flow variability and a new flow-based classification of Great Lakes tributaries. **R. Peter Richards** 53

Fish reproductive utilization of coastal marshes of Lake Ontario near Toronto. **Tasha D. Stephenson** 71

Effect of chelated trace metals on phosphorus uptake and storage in natural assemblages of Lake Michigan phytoplankton. **Claire L. Schelske and Linda Sicko-Goad** 82

Modeling the spatial distribution of seven halocarbons in Lake St. Clair in June 1984 using the TOXFATE model. **Efraim Halfon, Theodore J. Simons, and William M. Schertzer** 90

Transparency calibrations for Lake St. Clair and Lake Michigan. **Nathan Hawley and Jo Ellen Zyren** 113

Contaminant residues in the bloater (*Coregonus hoyi*) of Lake Michigan, 1969–1986. **Robert J. Hesselberg, James P. Hickey, David A. Nortrup, and Wayne A. Willford** 121

Notes

Yellow perch predation on lake trout eggs in Keuka Lake, New York. **John D. Fitzsimons** 130

Lake Michigan record levels of 1838, a present perspective. **Frank H. Quinn and Cynthia E. Sellinger** 133

Erythrocytic micronuclei in wild fish from Lakes Superior and Ontario that have pollution-associated neoplasia. **Ian R. Smith** 139

Occurence of *Bythotrephes cederstroemi* in Lake Ontario offshore waters. **Joseph C. Makarewicz and H. Douglas Jones** 143

Occurence of *Bythotrephes cederstroemi* (Schoedler 1877) in Lake Superior, with evidence of demographic variation within the Great Lakes. **David W. Garton and David J. Berg** 148

Anchistropus sp. (Crustacea: Cladocera: Chydoridae): a new distribution record for Lake Erie. **Marlene S. Evans, Jarl K. Hiltunen, and Donald W. Schloesser** 153

Attached filamentous algae of northern Lake Superior: field ecology and biomonitoring potential during 1983. **Michael B. Jackson, Elizabeth M. Vandermeer, and Lucja S. Heintsch** 158

Report

How clean is clean in Great Lakes Areas of Concern? Report from the 1988 IAGLR symposium. **John H. Hartig, David E. Rathke, and Donald J. Williams** 169

VOL. 16	1990	No. 2

Editorial. Alena Mudroch 183

Articles

Morphological deformities in Chironomidae (Diptera) larvae from the Lac St. Louis and Laprairie basins of the St. Lawrence River. **W. F. Warwick** 185

Abundance of spawning Pacific salmon in two Lake Superior streams, 1981–1987. **J. R. M. Kelso and D. B. Noltie** 209

Modeling the fate and transport of organic contaminants in Lake St. Clair. **Gregory A. Lang and Thomas D. Fontaine** 216

Decreasing chloride trends observed at Lake Erie municipal water intakes. **Robert S. Whyte, John H. Hartig, and Gordon J. Hopkins** 233

Estimation of recruitment forgone resulting from larval fish entrainment. **A. L. Jensen** 241

Relationship between chlorinated hydrocarbons and organic carbon in sediment and porewater. **Paul D. Capel and Steven J. Eisenreich** 245

Experimental use of dialysis chamber arrays to study P-fluxes in the Bay of Quinte, 1987. **P. G. Sly** 258

Food habits of angler-caught salmonines in western Lake Huron. **James S. Diana** 271

Recovery of an offshore lake trout (*Salvelinus namaycush*) population in eastern Lake Superior. **Gary L. Curtis** 279

Estimating the variation of buoy wind and wave data biases. **Stephen Clodman** 288

Inorganic contaminants in suspended solids from Hamilton Harbour. **Tatiana Mayer and Philip G. Manning** 299

Planktonic protozoa in Lakes Huron and Michigan: seasonal abundance and composition of ciliates and dinoflagellates. **Hunter J. Carrick and Gary L. Fahnenstiel** 319

Note

Evidence for alewife (*Alosa pseudoharengus*) predation on the European cladoceran *Bythotrephes cederstroemi* in northern Lake Michigan. **Timothy J. Keilty** 330

Commentary

Comments on the 32nd Annual Conference on Great Lakes Research. **John R. Krezoski** 334

VOL. 16 **1990** **No. 3**

Editorial

Biological remediation of contaminated sediments. **C. T. Jafvert** 337

Articles

Photoheterotrophy and dark heterotrophy in ice-covered Lake St. Clair. **D. G. Wallen** 339

Dynamics of the *Bythotrephes* invasion of the St. Lawrence Great Lakes. **W. Gary Sprules, Howard P. Riessen, and Edward H. Jin** 346

Flow distribution in the St. Lawrence River system at Wolfe Island, Kingston Basin, Lake Ontario. **I. K. Tsanis and C. R. Murthy** 352

Evaluation of sediment traps in Lake St. Clair, Lake Ontario, and Hamilton Harbour. **F. M. Boyce, P. F. Hamblin, D. G. Robertson, and F. Chiocchio** 366

Sudden, extreme Lake Erie storm surges and the interaction of wind stress, resonance, and geometry. **Charles Libicki and Keith W. Bedford** 380

Polychlorinated biphenyls in Lake Michigan tributaries. **Edwin A. Marti and David E. Armstrong** 396

Historical variation of water levels in Lakes Erie and Michigan-Huron. **Craig T. Bishop** 406

Comparison of measured and simulated flows during the 15 December 1987 Detroit River flow reversal. **Jan A. Derecki and Frank H. Quinn** 426

Determination of available subsurface light for photochemical and photobiological activity. **J. H. Jerome, R. P. Bukata, and J. E. Bruton** 436

A quantitative model of the dispersal of detrital inputs and minor compositional components in Lake Michigan sediments. **Andrew R. B. Zimmerman and Robert M. Owen** 444

Toxicity of sediments from western Lake Erie and the Maumee River at Toledo, Ohio, 1987: implications for current dredged material disposal practices. **R. A. Hoke, J. P. Giesy, G. T. Ankley, J. L. Newsted, and J. R. Adams** 457

Monitoring river plume transport and mesoscale circulation in Green Bay, Lake Michigan, through satellite remote sensing. **Richard G. Lathrop Jr., John R. Vande Castle, and Thomas M. Lillesand** 471

Note

Horsehair worms (Phylum Nematomorpha) in Lake Michigan. **Philip A. Cochran, Dreux J. Watermolen, and Ginny L. Haen** 485

Minutes of the Annual Membership Meeting 488

VOL. 16 1990 No. 4

Fish Community Health: Monitoring and Assessment in Large Lakes

Preface. Steven A. Spigarelli 493

Prologue. Carlos M. Fetterolf, Jr. 494

Articles

Behavioral reactions for the assessment of stress in fishes. **Thomas L. Beitinger** 495

Review of biochemical methods and other indicators to assess fish health in aquatic ecosystems containing toxic chemicals. **Arthur J. Niimi** 529

Whole-animal physiological processes for the assessment of stress in fishes. **Thomas L. Beitinger and Robert W. McCauley** 542

A critical appraisal of population approaches in assessing fish community health. **Donald L. DeAngelis, Lawrence W. Barnthouse, Webster Van Winkle, and Robert G. Otto** 576

Using lake trout as a surrogate of ecosystem health for oligotrophic waters of the Great Lakes. **Clayton J. Edwards, Richard A. Ryder, and Terry R. Marshall** 591

Challenges in the detection and diagnosis of pathological change in aquatic ecosystems. **David J. Rapport** 609

Commentaries

Ecosystem health, a human perception: definition, detection, and the Dichotomous Key. **Richard A. Ryder** 619

New strategies for Great Lakes toxicology. **Michael Gilbertson, Glen A. Fox, Mary Henry, and James P. Ludwig** 625

Fish community health assessment: a useful concept? **Peter V. Hodson** 628

Commentary on fish community health: monitoring and assessment in large lakes. **Joseph F. Koonce** 631

Determining the health of fish communities—parallels with human medicine. **Robert W. McCauley** 635

Observations on fish community health. **Wayne A. Willford** 637

Assessment and management of fish community health in the Great Lakes: synthesis and recommendations. **David O. Evans, Glenn J. Warren, and Victor W. Cairns** 639

Miscellaneous. 670

Index, Journal of Great Lakes Research, Volume 16, 1990 671

Author Index

Adams, J. R., 457
Ankley, G. T., 457
Armstrong, D. E., 396

Barnthouse, L. W., 576
Bedford, K. W., 380
Beitinger, T. L., 495, 542
Berg, D. J., 148
Bishop, C. T., 406
Boyce, F. M., 366
Bruton, J. E., 436
Bukata, R. P., 436

Cairns, V. W., 639
Capel, P. D., 245
Carrick, H. J., 319
Chiocchio, F., 366
Clodman, S., 288
Cochran, P. A., 485
Colquhoun, J. R., 41
Culp, L. R., 3
Cummings, L., 41
Curtis, G. L., 279

Dean, H. J., 41
DeAngelis, D. L., 576
Derecki, J. A., 426
Diana, J. S., 271

Edwards, C. L., 591
Eisenreich, S. J., 245
Evans, D. O., 639
Evans, M. S., 27, 153

Fahnenstiel, G. L., 319
Fitzsimons, J. D., 130
Fontaine, T. D., 216
Fox, G. A., 625

Garton, D. W., 148
George, S. E., 3
Giesy, J. P., 457
Gilbertson, M., 625

Haen, G. L., 485
Haffner, G. D., 21
Halfon, E., 90
Hamblin, P. F., 366
Hartig, J. H., 169, 233
Hawley, N., 113
Heintsch, L. S., 158
Henry, M., 625
Hebert, C. E., 21
Hesselberg, R. J., 121
Hickey, J. P., 121
Hiltunen, J. K., 153
Hodson, P. V., 628
Hoke, R. A., 457
Hopkins, G. J., 233
Hurley, D. A., 11

Jackson, M. B., 158
Jensen, A. L., 241
Jerome, J. H., 436
Jin, E. H., 346
Johnson, M. G., 3
Jones, H. D., 143

Keilty, T. J., 330
Kelso, J. R. M., 209
Koonce, J. F., 631

Lang, G. A., 216
Lathrop, R. G., Jr., 471
Lazar, R., 21
Libicki, C., 380
Lillesand, T. M., 471
Ludwig, J. P., 625

Makarewicz, J. C., 143
Manning, P. G., 299
Marshall, T. R., 591
Marti, E. A., 396
Mayer, T., 299
McCauley, R. W., 542, 635
Meade, J., 41
Miccoli, J., 41
Montour, L., 21
Murthy, C. R., 352

Newsted, J. L., 457
Niimi, A. J., 529
Noltie, D. B., 209
Nortrup, D. A., 121

Otto, R. G., 576
Owen, R. M., 444

Quigley, M. A., 27
Quinn, F. H., 133, 426
Ragotzkie, R. A., 1
Rapport, D. J., 609
Rathke, D. E., 169
Richards, R. P., 53
Ridgway, M. S., 11
Riessen, H. P., 346

Robertson, D. G., 366
Ryder, R. A., 591, 619

Schelske, C. L., 82
Schertzer, W. M., 90
Schloesser, D. W., 153
Scott, K. A., 11
Sellinger, C. E., 133
Sicko-Goad, L., 82
Simons, T. J., 90
Skea, J. C., 41
Sly, P. G., 258
Smith, I. R., 139
Sprules, W. G., 346
Stephenson, T. D., 71
Symula, J., 41

Tsanis, I. K., 352

Van Winkle, W., 576
Vande Castle, J. R., 471
Vandermeer, E. M., 158

Wallen, D. G., 339
Warren, G. J., 639
Warwick, W. F., 185
Watermolen, D. J., 485
Weis, I. M., 21
Whyte, R. S., 233
Willford, W. A., 121, 637
Williams, D. J., 169
Wojcik, J. A., 27

Zimmerman, A. R. B., 444
Zyren, J. E., 113

Geographic Index

Bay of Quinte, 11, 258

Detroit River, 90, 426

Georgian Bay, 3

Hamilton Harbour, 299, 366

Keuka Lake (New York), 130

Lake Erie, 153, 233, 241, 380, 406, 457
Lake Huron, 271, 319, 406
Lake Michigan, 27, 82, 113, 121, 133, 319, 330, 406, 444, 485
Lake Ontario, 11, 41, 71, 139, 143, 258, 299, 352, 366
Lake St. Clair, 21, 90, 113, 216, 339, 366
Lake Superior, 139, 148, 158, 185, 245, 279

St. Lawrence River, 184, 352

Walpole Island, 21

Subject Index

alewife, 11, 143, 271, 330
algae, 158
amphipods, 27
aquatic animals, 485
aquatic ecosystems, 609
aquatic productivity, 82

Bay of Quinte, 11, 258
beach erosion, 444
benthos, 27, 153, 457, 485
bioindicators, 495, 529, 591
buoys, 288

carcinogens, 139
cesium, 216
chironomids, 184
chlorides, 233
ciliates, 319
climate change, 406
coastal engineering, 406
coastal marshes, 71
coastal waters, 3
computer models, 576
crustaceans, 27, 153
current meters, 352
cycling nutrients, 258

data collections, 288
design water levels, 406
detritus, 444
Detroit River, 90, 426
dinoflagellates, 319
dredging, 457

ecological distribution, 143, 346
ecological indicators, 609
ecosystem health, 609
ecosystems, 639
epidemiology, 639
epizootiology, 639
erosion, 444
eutrophication, 82, 471

fate of pollutants, 216
fish, 121
fish behavior, 542
fish diet, 271, 330
fish diseases, 41, 139
fish eggs, 130
fish establishment, 185
fish food organisms, 11, 271, 330
fish hatcheries, 41
fish management, 185, 241, 279, 495, 529, 542, 576, 591, 609, 639
fish migration, 71, 185
fish populations, 71, 130, 241, 279
fish stocking, 271
fish toxins, 529
flow characteristics, 53
flow discharge, 53
flow measurement, 352, 426
flow pattern, 53

geochemistry, 444
Georgian Bay, 3
grazing, 319
Great Lakes, 639

Hamilton Harbour, 299
heavy metals, 299
history, 133

indicators, 529, 591
international agreements, 169
international commissions, 169
iron, 299
irradiation, 436

lake circulation, 471
Lake Erie, 153, 233, 241, 380, 406, 457
lake fisheries, 130
Lake Huron, 271, 319, 406
Lake Michigan, 27, 82, 113, 121, 133, 319, 330, 406, 444, 485
Lake Michigan tributaries, 396
Lake Ontario, 11, 41, 71, 139, 143, 258, 299, 352, 366
lake sediments, 444
Lake St. Clair, 90, 113, 216, 339, 366
lake stages, 426
Lake Superior, 139, 148, 158, 185 245, 279
lake trout, 41, 130, 279, 591
light intensity, 436
light penetration, 436
light quality, 436
load distribution, 352

mallards, 21
management, 90
mathematical models, 90, 216, 426, 444, 576
metals, 158
midges, 184
model studies, 90, 216
monitoring, 121
municipal water, 233
mutagen, 139
myxobacteria, 41

nonpoint pollution sources, 53
nutrients, 82, 158

organic carbon, 245
organic compounds, 90
organochlorines, 21
oxygen, 495

particle size, 113
particulate matter, 113
perch, 130, 241
pesticides, 121
phosphorus, 82, 258, 299
photosynthesis, 339
physical processes, 380
physiological ecology, 542
phytoplankton, 82, 158, 339
pollutants, 121
pollution, 169
pollution load, 233, 396, 471
polychlorinated biphenyls, 121, 158, 184, 216, 245, 396
population dynamics, 576
powerplants, 241
predation, 27
primary production, 339
protozoa, 319

radioactive dating, 3
redhead, 21
remote sensing, 471
resonance, 380

salmon, 185, 271
sampling, 366
satellite technology, 352, 471
sculpin, 27
sea lamprey, 279
sediment, 366
sediment traps, 366
sediment-water interfaces, 245, 258
sedimentation rates, 3
sediments, 299, 457
St. Lawrence River, 184, 352
statistical analysis, 53, 233
storm surges, 380
stream discharge, 53
sublethal effects, 495
suspended solids, 113, 366, 471

taxonomy, 148, 153
temperature, 495
thermal plumes, 471
time series analysis, 233
toxic substances, 90, 121, 139, 184, 245, 396, 457, 495, 529, 639
toxicity, 457
trace metals, 82, 184
transparency, 113
tributaries, 53

water level fluctuations, 133, 426
water levels, 133
water temperature, 11
waves, 288
wetlands, 21, 71
wind setup, 380
wind velocity, 288
wind-driven currents, 380, 426

zooplankton, 143, 148, 153, 330, 346